Beamline 20-BM / PNC-CAT

Scientific focus: Materials science and environmental science

Scientific programs: Material science, environmental science, and surface science

Optics & Optical Performance

- BESSRC-type monochromator
  - 29 m from source
  - 3.5–26 keV energy range Si(111)
  - 20–75 keV energy range Si(333)
  - 1–2 x 10^{-4} energy resolution ($\Delta E/E$)
  - 35 mm offset
  - water cooling
  - 2nd crystal : 3 mrad acceptance for sagittal focusing *(curr. unfocused)*
- harmonic rejection mirror
  - variable angle: 4–30 keV critical energy
  - provides vert. focusing to better than 50 μm

Experiment Stations

20-BM-A

- white beam first optics enclosure

20-BM-B

- monochromatic general purpose station

Detectors

- ionization chambers
- 13-element and single-element Ge
- CCDs
- Siemens Hi Star area detector
- NaI scintillation
- Si diodes

Beamline Controls and Data Acquisition

- Sun, UNIX with EPICS/VME
- Windows NT with LabView
- SPEC

Beamline Support Equipment/Facilities

- MBE/UHV surface chamber *(planned)*
- microtomography at 10 micron resolution
- 4-circle kappa geometry diffractometer

Bending Magnet Source Characteristics (nominal)

source	APS bending magnet
critical energy	19.51 keV
on-axis peak brilliance at 16.3 keV	2.9 x 10^{15} ph/sec/mrad²/mm²/0.1%bw
on-axis peak angular flux at 16.3 keV	9.6 x 10^{13} ph/sec/mrad²/0.1%bw
on-axis peak horizontal angular flux at 5.6 keV	1.6 x 10^{13} ph/sec/mradh/0.1%bw
source size at critical energy Σ_x Σ_y	 145 μm 36 μm
source divergence at critical energy $\Sigma_{x'}$ $\Sigma_{y'}$	 6 mrad 47 μrad